MODUL PERKULIAHAN ELEARNING
MATA KULIAH - MCM 205 – ECOMMERCE (3 SKS)

PERTEMUAN 5 – *ELEARNING*

SISTEM PEMBAYARAN E-COMMERCE

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Sumber penulisan modul:
Kenneth C. Laudon and Carol Guercio Traver. 2014. *e-Commerce Business Technology Society*. 10th Edition. New Jersey: Pearson. Halaman 296-320.

TYPES OF PAYMENT SYSTEMS

In order to understand e-commerce payment systems, you first need to be familiar with the various types of generic payment systems. Then you will be able to clarify the different requirements that e-commerce payment systems must meet and identify the opportunities provided by e commerce technology for developing new types of payment systems. There are **five main types of payment systems**: (1) cash; (2) checking transfer; (3) credit cards: (4) stored value and (5) accumulating balance.

Cash

Cash, which is legal tender defined by a national authority to represent value, is the most common form of payment in terms of number of transactions. **The key feature of cash** is that it is instantly convertible into other forms of value without the intermediation of any other institution. For instance, free airline miles are not cash because they are not instantly convertible into other forms of value—they require intermediation by a third party (the airline) in order to be exchanged for value (an airline ticket). Private organizations sometimes create a form of private cash called scrip that can be instantly redeemed by participating organizations for goods or cash. Examples include trading stamps, “point” programs, and other forms of consumer loyalty currency.

Cash, legal tender defined by a national authority to represent value

Why is cash still so popular today? Cash is **portable**, requires no authentication, and provides instant purchasing power for those who possess it. Cash allows for micropayments (payments of small amounts). The use of cash is "free" in that neither merchants nor consumers pay a transaction fee for using it. Using cash does not require any complementary assets, such as special hardware or the existence of an account, and it puts very low cognitive demands on the user. Cash is anonymous and difficult to trace, and in that sense it is "private." Other forms of payment require significant use of third parties and leave an extensive digital or paper trail.

On the other hand, cash is limited to smaller transactions (you can't easily buy a car or house with cash), it is easily stolen, and it does not provide any **float** (the period of time between a purchase and actual payment for the purchase); when it is spent, it is gone. With cash, purchases tend to be final and irreversible (i.e., they are irrefutable) unless otherwise agreed by the seller.

Float, the period of time between a purchase and actual payment for the purchase

Checking Transfer

A **checking transfer**, which represents funds transferred directly via a signed draft or check from a consumer's checking account to a merchant or other individual, is the second most common form of payment in the United States in terms of number of transactions, and the most common in terms of total amount spent.

checking transfer, funds transferred directly via a signed draft or check from a consumer's checking account to a merchant or other individual

Checks can be used for both small and large transactions, although typically they are not used for micropayments (less than $1). Checks have some float (it can take up to 10 days for out-of-state checks to clear), and the unspent balances can earn interest. Checks are not anonymous and require third-party institutions to work. Checks also introduce security risks for merchants: They can be forged more easily than cash, so authentication is required. For merchants, checks also present some additional risk compared to cash because they can be canceled before they clear the account or they may bounce if there is not enough money in the account.

Credit Card

A **credit card** represents an account that extends credit to consumers, permits consumers to purchase items while deferring payment, and allows consumers to make payments to multiple vendors

with one instrument. **Credit card associations** such as Visa and MasterCard are nonprofit associations that set standards for the **issuing banks**—such as Citibank—that actually issue the credit cards and process transactions. Other third parties (called **processing centers** or **clearinghouses**) usually handle verification of accounts and balances. Credit card issuing banks act as financial intermediaries, minimizing the risk to transacting parties.

credit card represents an account that extends credit to consumers, permits consumers to purchase items while deferring payment, and allows consumers to make payments to multiple vendors at one time

credit card association, nonprofit association that sets standards for issuing banks

issuing bank, bank that actually issues credit cards and processes transactions

processing center, (**clearinghouse**) institution that handles verification of accounts and balances

Credit cards offer consumers a line of credit and the ability to make small and large purchases instantly. They are widely accepted as a form of payment, reduce the risk of theft associated with carrying cash, and increase consumer convenience. Credit cards also offer consumers considerable float. With a credit card, for instance, a consumer typically need not actually pay for goods purchased until receiving a credit card bill 30 days later. There were around 540 million credit cards in circulation in the United States in 2012 (Nilson Report, 2013). Merchants benefit from increased consumer spending resulting from credit card use, but they pay a hefty transaction fee of 3% to 5% of the purchase price to the issuing banks. In addition, federal Regulation Z places the risks of the transaction (such as credit card fraud, repudiation of the transaction, or nonpayment) largely on the merchant and credit card issuing bank. Regulation Z limits cardholder liability to $50 for unauthorized transactions that occur before the card issuer is notified. Once a card is reported stolen, consumers are not liable for any subsequent charges.

Credit cards have less finality than other payment systems because consumers can refute or repudiate purchases under certain circumstances, and they limit risk for consumers while raising risk for merchants and bankers.

Stored Value

Accounts created by depositing funds into an account and from which funds are paid out or withdrawn as needed are stored value payment systems. **Stored value payment systems** are similar in some

respects to checking transfers—which also store funds—but do not involve writing a check. Examples include debit cards, gift certificates, prepaid cards, and smart cards. **Debit cards** immediately debit a checking or other demand-deposit account. For many consumers, the use of a debit card eliminates the need to write a paper check. There were 560 million debit cards in use nationwide in 2012 (The Nilson Report, 2013). However, because debit cards are dependent on funds being available in a consumer's bank account, larger purchases are still typically paid for by credit card, and their use in the United States still lags behind that of other developed nations, in part because they do not have the protections provided by Regulation Z and they do not provide any float.

stored value payment system account created by depositing funds into an account and from which funds are paid out or withdrawn as needed.

debit card immediately debits a checking or other demand deposit account.

Peer-to-peer (P2P) payment systems such as **PayPal** are variations on the stored value concept. P2P payment systems do not insist on prepayment but do require an account with a stored value, either a checking account with funds available or a credit card with an available credit balance. PayPal is often referred to as a P2P payment system because it allows small merchants and individuals to accept payments without using a merchant bank or processor to clear the transaction.

Accumulating Balance

Accounts that accumulate expenditures and to which consumers make periodic payments are **accumulating balance payment systems**. Traditional examples include utility, phone, and American Express accounts, all of which accumulate balances, usually over a specified period (typically a month), and then are paid in full at the end of the period.

accumulating balance payment system account that accumulates expenditures and to which consumers make periodic payments

PAYMENT SYSTEMS STAKEHOLDERS

The main stakeholders in payment systems are (1) **consumers**; (2) **merchants**; (3) **financial intermediaries** and (4) **government regulators**. Each of these stakeholders has different preferences. **Consumers are interested** primarily in low-risk, low-cost, refutable (able to be repudiated or denied), convenient, and reliable payment mechanisms. Consumers have demonstrated they will not use new payment mechanisms unless they are equally or more beneficial to them

than existing systems. In general, most consumers use cash, checks, and/or credit cards. The specific payment system chosen will change depending on the transaction situation. For instance, cash may be preferred to keep certain transactions private and anonymous, but the same consumer may want a record of transaction for the purchase of a car.

Merchants are interested primarily in low-risk, low-cost, irrefutable (i.e., final), secure, and reliable payment mechanisms. Merchants currently carry much of the risk of checking and credit card fraud, refutability of charges, and much of the hard ware cost of verifying payments. Merchants typically prefer payments made by cash, check, and to a lesser extent credit cards, which usually carry high fees and allow transactions to be repudiated after the fact by consumers.

Financial intermediaries, such as banks and credit card networks, **are primarily interested** in secure payment systems that transfer risks and costs to consumers and merchants, while maximizing transaction fees payable to themselves. The preferred payment mechanisms for financial intermediaries are checking transfers, debit cards, and credit cards.

Government regulators are interested in maintaining trust in the financial system. Regulators seek to protect against fraud and abuse in the use of payment systems; ensure that the interests of consumers and merchants are balanced against the interests of the financial intermediaries whom they regulate; and enforce information reporting laws. The most important regulations of payment systems in the United States are Regulation Z, Regulation E, and the Electronic Funds Transfer Act (EFTA) of 1978, regulating ATM machines. Regulation Z limits the risk to consumers when using credit cards. In contrast, EFTA and Regulation E place more risk on consumers when using debit or ATM cards. For instance, if you lose an ATM card or debit card, you are potentially liable for any losses to the account. However, in reality, Visa and MasterCard have issued policies that limit consumer risk for loss of debit cards to the same $50 that applies to credit cards.

ECOMMERCE PAYMENT SYSTEMS

For the most part, existing payment mechanisms have been able to be adapted to the online environment, albeit with some significant limitations that have led to efforts to develop alternatives. In addition, new types of purchasing relationships, such as between individuals online, and new technologies, such as the development of the mobile platform, have also created both a need and an opportunity for the development of new payment systems. In this section, we provide an overview of the major e-commerce payment systems in use today. **Table 1** lists some of the major trends in e-commerce payments in 2013–2014.

Table 1	Major Trends in E-Commerce Payments 2013–2014
1)	Payment by credit and/or debit card remains the dominant form of online payment.
2)	Mobile retail payment volume skyrockets.
3)	PayPal remains the most popular alternative payment method online.
4)	Start-up Square begins to gain traction with a smartphone app, credit card reader, and credit card processing service that permits anyone to accept credit card payments.
5)	Google introduces Google Wallet, a mobile payment system based on **near field communication** (NFC) chips; Apple continues to go its own way, releasing iPhone 5S with fingerprint sensing technology but without NFC chips.

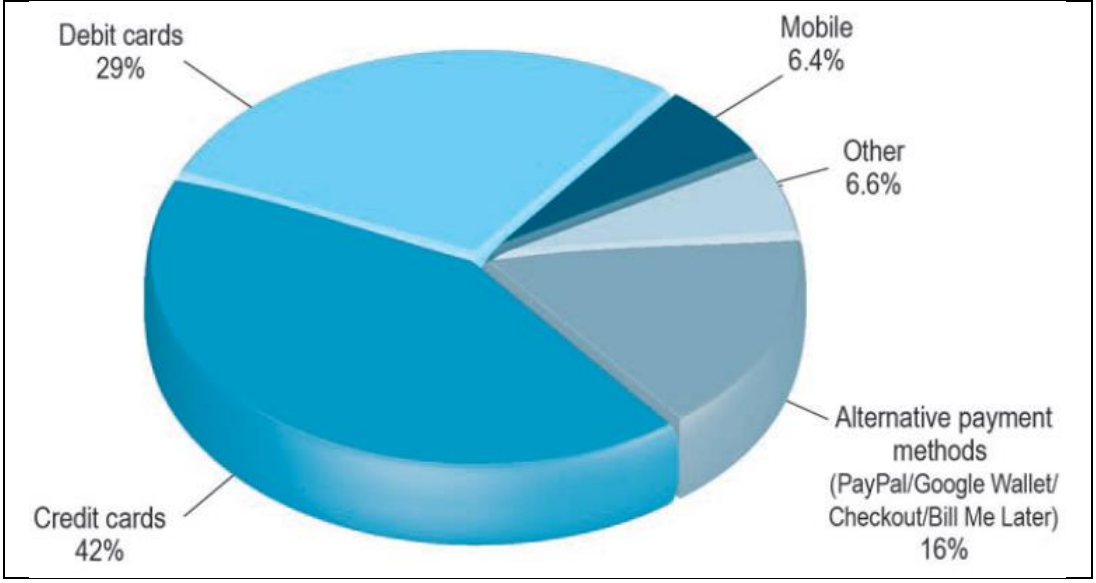
U.S. online payments represent a market of almost $420 billion in 2013, and are expect to grow an additional $220 million to around $640 billion by 2017. Institutions and business firms that can handle this volume of transactions (mostly the large banking and credit firms) generally extract 2%–3% of the transactions in the form of fees, or about $8 to $13 billion a year in revenue. Given the size of the market, competition for online payments is spirited.

In the United States, the primary form of online payment is still the existing credit card system. Although credit card usage slipped somewhat during the recession, the total payments volume for online use of credit cards by U.S. consumers is expected to remain steady through 2017, while usage of debit cards decline. Alternative payment methods, although currently representing around 16% of e-commerce transactions, are expected to continue to make inroads into traditional payment methods, growing to around 20% of all online payment transactions by 2017. Mobile payments are also expected to grow significantly by 2017 (Javelin Strategy & Research, 2012; Digital Transactions, 2012). **Figure 1** illustrates the approximate usage of various payment types. **Figure 2** illustrates the percentage of consumers that use various alternative payment methods.

In other parts of the world, e-commerce payments can be very different depending on traditions and infrastructure. Credit cards are not nearly as dominant a form of online payment as they are in the United States. If you plan on operating a Web site in Europe, Asia, or Latin America, you will need **to develop different payment systems** for each region. Consumers in Europe rely for the most part on bank debit cards (especially in Germany) and some credit cards. Online purchases in China are typically paid for by check or cash when the consumer picks up the goods at a local store. In Japan, consumers use postal and bank transfers and CODs, using local convenience stores (konbini) as the pickup and payment point. Japanese consumers also use accumulated balance accounts with the telephone company for Internet purchases made from their home computers. Japan and some European countries make

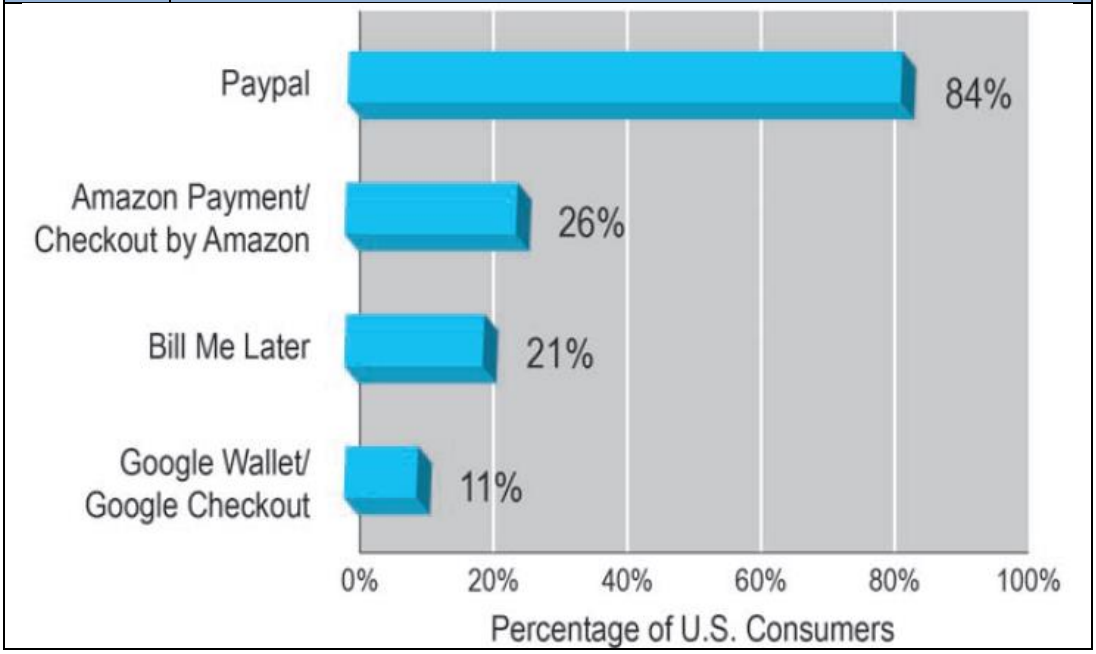
extensive use of mobile phones for payment of small purchases (and even parking tickets).

Figure 1 Online Payment Methods in the United States



Traditional credit cards are still the dominant method of payment for online purchases, although alternative methods such as PayPal and mobile payments are faster growing.
SOURCES: Based on data from Javelin Strategy & Research, 2012; Digital Transactions, 2012; industry sources.

Figure 2 Alternative Payment Methods Used by Consumers in the United States, 2012



PayPal is, by far, the most popular alternative payment method.
SOURCES: Based on data from Javelin Strategy & Research, 2012; Digital Transactions, 2012.

ONLINE CREDIT CARD TRANSACTIONS

Because credit and debit cards are the dominant form of online payment, it is important to understand how they work and to recognize the strengths and weaknesses of this payment system. Online credit card transactions are processed in much the same way that in-store purchases are, with the major differences being that online merchants never see the actual card being used, no card impression is taken, and no signature is available. Online credit card transactions most closely resemble Mail Order-Telephone Order (MOTO) transactions. These types of purchases are also called Cardholder Not Present (CNP) transactions and are the major reason that charges can be disputed later by consumers. Since the merchant never sees the credit card, nor **receives a hand-signed agreement to pay from the customer**, when disputes arise, the merchant faces the risk that the transaction may be disallowed and reversed, even though he has already shipped the goods or the user has downloaded a digital product.

Figure 3	HOW AN ONLINE CREDIT CARD TRANSACTION WORKS

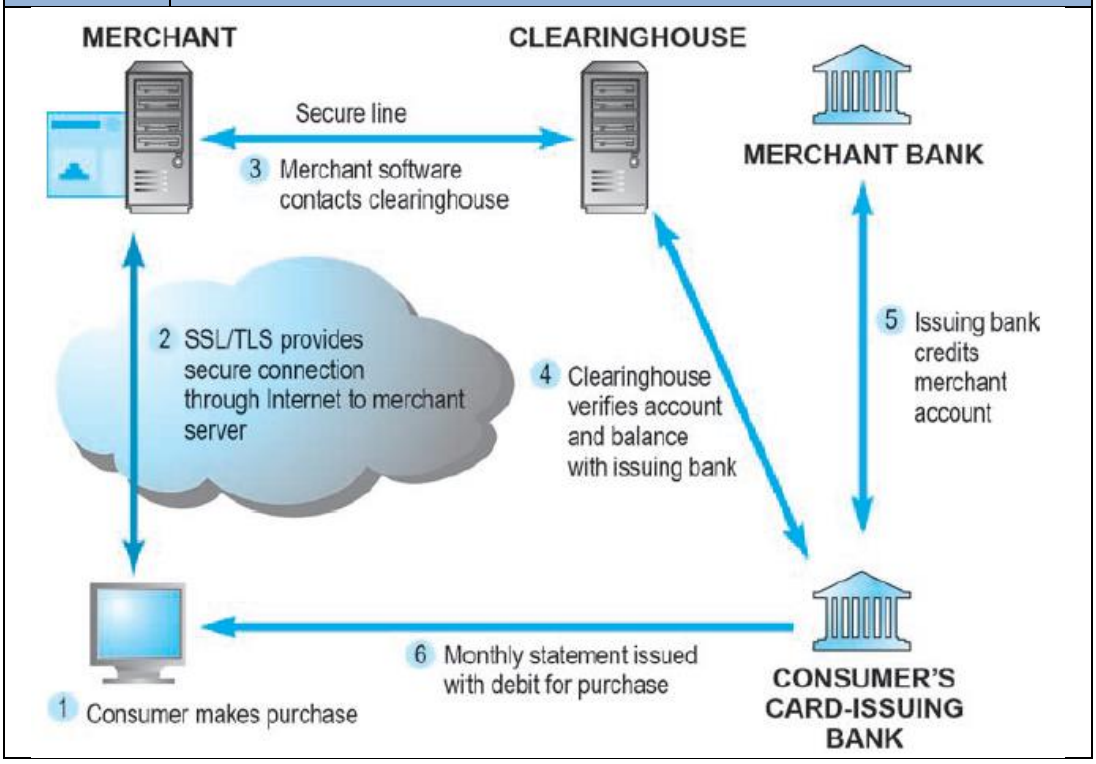


Figure 3 illustrates the online credit card purchasing cycle. There are **five parties** involved in an online credit card purchase: (1) **consumer**; (2) **merchant**; (3) **clearinghouse**, (4) **merchant bank** (sometimes called the "**acquiring bank**") and (5) **the consumer's card issuing bank**. In

order to accept payments by credit card, online merchants must have a merchant account established with a bank or financial institution. A **merchant account** is simply a bank account that allows companies to process credit card payments and receive funds from those transactions.

merchant account a bank account that allows companies to process credit card payments and receive funds from those transactions

As shown in **Figure 3**, an online credit card transaction begins with a purchase **(1)**. When a consumer wants to make a purchase, he or she adds the item to the merchant's shopping cart. When the consumer wants to pay for the items in the shopping cart, a secure tunnel through the Internet is created using SSL/TLS. Using encryption, SSL/TLS secures the session during which credit card information will be sent to the merchant and protects the information from interlopers on the Internet **(2)**. SSL does not authenticate either the merchant or the consumer. The transacting parties have to trust one another.

Once the consumer credit card information is received by the merchant, the merchant software contacts a clearinghouse **(3)**. As previously noted, a clearinghouse is a financial intermediary that authenticates credit cards and verifies account balances. The clearinghouse contacts the issuing bank to verify the account information **(4)**. Once verified, the issuing bank credits the account of the merchant at the merchant's bank (usually this occurs at night in a batch process) **(5)**. The debit to the consumer account is transmitted to the consumer in a monthly statement **(6)**.

Credit Card E-commerce Enablers

Companies that have a merchant account still need to buy or build a means of handling the online transaction; securing the merchant account is only step one in a two-part process. Today, Internet payment service providers (sometimes referred to as payment gateways) can provide both a merchant account and the software tools needed to process credit card purchases online.

For instance, Authorize.net is an Internet payment service provider. The company helps a merchant secure an account with one of its merchant account provider partners and then provides payment processing software for installation on the merchant's server. The software collects the transaction information from the merchant's site and then routes it via the Authorize.net "payment gateway" to the appropriate bank, ensuring that customers are authorized to make their purchases. The funds for the transaction are then transferred to the merchant's merchant account. CyberSource is another well-known Internet payment service provider.

Limitations of Online Credit Card Payment Systems

There are a number of limitations to the existing credit card payment system. The most important limitations involve security, merchant risk, administrative and transaction costs, and social equity. The existing system offers poor security. Neither the merchant nor the consumer can be fully authenticated. The merchant could be a criminal organization designed to collect credit card numbers, and the consumer could be a thief using stolen or fraudulent cards. The risk facing merchants is high: consumers can repudiate charges even though the goods have been shipped or the product downloaded. The banking industry attempted to develop a **secure electronic transaction** (SET) protocol, but this effort failed because it was too complex for consumers and merchants alike.

The administrative costs of setting up an online credit card system and becoming authorized to accept credit cards are high. Transaction costs for merchants also are significant—roughly 3.5% of the purchase plus a transaction fee of 20–30 cents per transaction, plus other setup fees.

Credit cards are not very democratic, even though they seem ubiquitous. Millions of young adults do not have credit cards, along with almost 100 million other adult Americans who cannot afford cards or who are considered poor risks because of low incomes.

ALTERNATIVE ONLINE PAYMENT SYSTEMS

The limitations of the online credit card system have opened the way for the development of a number of alternative online payment systems. Chief among them is PayPal. PayPal (purchased by eBay in 2002) enables individuals and businesses with e-mail accounts to make and receive payments up to a specified limit. Paypal is an example of **an online stored value payment system**, which permits consumers to make instant, online payments to merchants and other individuals based on value stored in an online account. In 2012, PayPal processed $145 billion in payments ($48 billion of which were generated on eBay, and $97 billion elsewhere on the Web), and had 132 million active registered users. PayPal builds on the existing financial infrastructure of the countries in which it operates. You establish a PayPal account by specifying a credit, debit, or checking account you wish to have charged or paid when conducting online transactions. When you make a payment using PayPal, you e-mail the payment to the merchant's PayPal account. PayPal transfers the amount from your credit or checking account to the merchant's bank account. The beauty of PayPal is that no personal credit information has to be shared among the users, and the service can be used by individuals to pay one another even in small amounts. Issues with PayPal include its high cost (in addition to paying the credit card fee of 3.5%, PayPal tacks on a variable fee of 1.5%–3% depending on the size of the transaction) and its lack of consumer protections when a fraud occurs or a charge is repudiated.

Although PayPal is by far the most well-known and commonly used online credit/ debit card alternative, there are a number of other alternatives as well. Amazon Payments is aimed at consumers who have concerns about entrusting their credit card information to unfamiliar online retailers. Consumers can purchase goods and services at non-Amazon Web sites using the payment methods stored in their Amazon accounts, without having to reenter their payment information at the merchant's site. Amazon provides the payment processing. Google Checkout (now merged into Google Wallet, described further in the following section on mobile payment systems) offers similar functionality, enabling consumers to sign in once and then shop online at thousands of different stores without having to reenter account information.

Bill Me Later (owned by eBay as well) also appeals to consumers who do not wish to enter their credit card information online. Bill Me Later describes itself as an open ended credit account. Users select the Bill Me Later option at checkout and are asked to provide their birth date and the last four digits of their social security number. They are then billed for the purchase by Bill Me Later within 10 to 14 days. Bill Me Later is currently offered by more than 1,000 online merchants.

WUPay (formerly eBillme, and now operated by Western Union) offers a similar service. WUPay customers who select the WUPay option at firms such as Sears, Kmart, Buy.com, and other retailers do not have to provide any credit card information. Instead they are e-mailed a bill, which they can pay via their bank's online bill payment service, or in person at any Western Union location. Dwolla is a similar cashbased payment network for both individuals and merchants. It bypasses the credit card network and instead connects directly into a bank account. Dwolla is free for transactions under $10 and only 25 cents per transaction for those over $10, and is currently available at more than 15,000 merchants.

Like Dwolla, Stripe is another company that is attempting to provide an alternative to the traditional online credit card system. Stripe focuses on the merchant side of the process. It provides simple software code that enables companies to bypass much of the administrative costs involved in setting up an online credit card system, and instead lets companies begin accepting credit card payments almost immediately without the need to obtain a merchant account or use a gateway provider. Unlike PayPal, the customer doesn't need a Stripe account to pay, and all payments are made directly to the company rather than being routed through a third party.

MOBILE PAYMENT SYSTEMS: YOUR SMARTPHONE WALLET

The use of mobile devices as payment mechanisms is already well established in Europe, Japan, and South Korea and is now exploding in the United States, where the infrastructure to support mobile payment is

finally being put in place. Mobile retail payments in the United States totalled over $20 billion in 2012 (Javelin Strategy & Research, 2012).

Near field communication (NFC) is one of the enabling technologies for mobile payment systems. Near field communication (NFC) is a set of short-range wireless technologies used to share information among devices within about 2 inches of each other (50 mm). NFC devices are either powered or passive. A connection requires one powered unit (the initiator), and one target unpowered unit that can respond to requests from the powered unit. NFC targets can be very simple forms such as tags, stickers, key fobs, or readers. NFC peer-to-peer communication is possible where both devices are powered. An NFC-equipped smartphone, for instance, can be swiped by a merchant's reader to record a payment wirelessly and without contact. In September 2011, Google introduced Google Wallet, a mobile app designed to work with NFC chips.

near field communication (NFC) a set of short-range wireless technologies used to share information among devices

Google Wallet currently works with the MasterCard PayPass contactless payment card system. It is also designed to work with Android smartphones that are equipped with NFC chips. About 20 million smartphones in the United States are now equipped with NFC, and over 140 million were sold worldwide in 2012. Almost all high-end smartphones now include NFC support, with the exception of the iPhone. Apple's iPhone 5S, introduced in September 2013, included a fingerprint sensor with technology it calls Touch ID, which will enable it to be used to authorize payments at the iTunes, iBooks, and App Stores without requiring users to enter a separate PIN or security code. However, Apple's failure thus far to include an NFC chip in the iPhone has slowed the adoption of NFC-based mobile wallet technology in the United States. PayPal and Square are attacking the mobile payment market from a different direction, with apps and credit card readers that attach to smartphones.

The promise of riches beyond description to a firm that is able to dominate the mobile payments marketplace has set off what one commentator has called a goat rodeo surrounding the development of new technologies and methods of mobile payment. The end-of-chapter case study, Online Payment Marketplace: Goat Rodeo, provides a further look at the future of online and mobile payment in the United States, including the efforts of PayPal, Google, Square, and others.

DIGITAL CASH AND VIRTUAL CURRENCIES

Although the terms digital cash and virtual currencies are often used synonymously, they actually refer to two separate types of alternative payment systems. **Digital cash** typically is based on an algorithm that

generates unique authenticated tokens representing cash value that can be used “in the real world.” Examples of digital cash include Bitcoin and Ukash. Bitcoins are encrypted numbers (sometimes referred to as cryptocurrency) that are generated by a complex algorithm using a peer-to-peer network in a process referred to as “mining,” that requires extensive computing power. Like real currency, Bitcoins have a fluctuating value tied to open-market trading. Like cash, Bitcoins are anonymous—they are exchanged via a 34-character alphanumeric address that the user has, and do not require any other identifying information. Bitcoins have recently attracted a lot of attention as a potential money laundering tool for cybercriminals, and have also been plagued by security issues, with some high-profile heists. Nonetheless, there are companies, such as BitPay, that are touting Bitcoins as a legitimate alternative payment system, and trying to make it easier for merchants to accept them. Read the Insight on Society case, Bitcoin, for a further look at Bitcoin and some of the issues surrounding it. Ukash is another digital cash system that uses a unique 19-digit code, and can be stored online in an eWallet. Ukash can be purchased at more than 460,000 retail locations around the globe, and used wherever it is accepted.

digital cash an alternative payment system in which unique, authenticated tokens represent cash value

Virtual currencies, on the other hand, typically circulate primarily within an internal virtual world community, such as Linden Dollars, created by Linden Lab for use in its virtual world, Second Life, or are associated with a specific corporation, such as Facebook Credits, which can be used to purchase Facebook gift cards. Both types are typically used for purchasing virtual goods.

virtual currency typically circulates within an internal virtual world community or is issued by a specific corporate entity, and used to purchase virtual goods.